



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460


OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION



January 12, 2018

**MEMORANDUM**

**Subject:** Review of AWP A E11-06/E11-12 Wood Leaching Studies (blocks in water) and for AWP A E20-08 (Wood leaching/Soil Depletion study) for 4,5-dichloro-2-n-octhyl-4-isothiazol-3-one (DCOIT, RH-287) for Viance Technical screen

PC Code: 128101	DP Barcode: D444872
Decision No. 531609	Registration No.: 83997-RG-VIANCE 11-2016
Petition No.: N/A	Regulatory Action: A550
Risk Assess Type: None	Case No.: N/A
TXR No.: N/A	CAS No.: 64359-81-5
MRID Nos.: 50335204, 50335205	40 CFR: N/A

**From:** James Breithaupt, Agronomist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

**Thru:** Laura Parsons, Acting Branch Chief (for Laura Parsons)   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)  
  
Geoffrey Sinclair, Acting Senior Interdisciplinary Scientist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

**To:** Aline Heffernan, Risk Manager Reviewer  
Zeno Bain, Product Manager  
Regulatory Management Branch I  
Antimicrobials Division (7510P)

**INTRODUCTION:**

The AWP A E11-06 studies for DCOIT (MRIDs 50335204, 50335205) are being reviewed as part of the registration process in the Antimicrobials Division. These studies are classified as acceptable and satisfy the AWP A E11-06/E11-12 data and AWP A E20-08 data requirement

The Data Evaluation Records (DERs) for these studies are attached.

## Data Evaluation Record 1


### STANDARD METHOD OF DETERMINING THE LEACHABILITY OF WOOD PRESERVATIVES (E11-06/E11-12)


**Report:** Laganella, D. (2017) Determination of Viance 11-2016 Leaching using AWP A E11 for Active Ingredient 4, 5, dichloro-2-n-octy-4-isothiazolin-3-one (DCOIT). Project Number: GLP/2017/064, AWP A/E11, GLP/2017/033. Unpublished study prepared by The Dow Chemical Company. 48p. MRID 50335204.

**Guideline:** AWP A E11-06/E11-12

**Classification:** The Laganella (2017) study for Standard Method of Determining the Leachability of Wood Preservative provides supplemental data and satisfies the AWP A E11-06/E11-12 data requirement for Viance 11-2016.

**PC Code:** 128101

**From:** James Breithaupt, Agronomist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

**Peer Review:** Diana Hsieh, Biologist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

### EXECUTIVE SUMMARY

The registrant submitted two separate wood leaching studies using the E11-06/E11-12 test guideline using similar test concentrations. For all treatments, the rate of leaching was essentially proportional to the concentration of DCOIT in wood blocks but the percentage of DCOIT leached was consistent for all concentrations. The maximum leaching rates ranged from 3.7-14.9  $\mu\text{g}/\text{cm}^2/\text{day}$  and the time-weighted 14-day average concentrations ranged from 2.9-7.4  $\mu\text{g}/\text{cm}^2/\text{day}$ . The total amount of DCOIT leached ranged from 9-10 %.

### I. MATERIALS AND METHODS

**Guideline followed:** AWP A E11-06/E11-12

**GLP Compliance:** This study was not conducted according to Good Laboratory Practices, but the study is not invalidated because it was conducted according to the AWP A E11-12 test guideline and determined to be scientifically sound.

## A. Materials:

**1. Test Material:** 4,5-Dichloro-2-n-Octyl-4-Isothiazolin-3-One (99.93 % purity)

## 2. Methods:

Southern Yellow Pine cubes (19 mm) were treated with nominal DCOIT concentrations of 6,780, 13,800, and 28,000 ppm in diesel fuel using pressure treatment instead of vacuum impregnation which is specified in the test guideline. Blank (untreated) cubes were also prepared. For each treatment, twelve (12) cubes were prepared, with six (6) being used in the test and six (6) being retained as unleached cubes (Table 6, p. 16). The six (6) cubes used for each treatment were submerged in 300 ml of deionized water for up to 14 days while agitated. Water samples were taken at 6 hours (0.25 day), 1, 2, 4, 7, 8, 10, 11, and 14 days. Chemical analysis of the water was conducted at each sampling interval using reverse-phase HPLC, which uses a hydrophobic column (stationary phase) and a hydrophilic mobile phase.

## II. RESULTS AND DISCUSSION

The observed treatment rates of the wood were consistent with the nominal treatment rates (Table 6 of study). Table 1 below contains the nominal and measured treatment rates, along with the mean and relative standard deviation (CV, %).

Table 1. DCOIT Concentrations in Treated Cubes

Nominal Wood Treatment Rate (mg/kg)	Measured Wood Treatment Rate (mg/kg)	% Difference <sup>1</sup>	Coefficient of Variability <sup>2</sup> (CV, %)
1,371	1,390	1.3	14.8
2,693	3,036	12.7	18.8
5,962	5,611	-6	14.3

<sup>1</sup>(Measured-nominal) \* 100/nominal)

<sup>2</sup>Average of 4 cubes

The leaching rates for DCOIT were proportional to the treatment rate of the cubes, which approximately doubled as the concentration of the testing solutions doubled. The maximum leaching rates ranged from 3.7-14.9  $\mu\text{g}/\text{cm}^2/\text{day}$ , the minimum leaching rates ranged from 0.11-0.4  $\mu\text{g}/\text{cm}^2/\text{day}$ , and the time-weighted 14-day average concentrations ranged from 1.9-7.4  $\mu\text{g}/\text{cm}^2/\text{day}$ . The total amount of DCOIT leached ranged from 9-10 %. The cumulative leaching ranged from 27-103  $\mu\text{g}/\text{cm}^2$ . Table 2 below contains the summarized leaching rates for the three tested concentrations.

Table 2. Leaching of DCOIT from Treated Southern Yellow Pine Cubes (AWPA E11-06/11-12)

<b>Leaching rate<sup>1</sup></b>	<b>Measured Wood Treatment Rate, mg/kg (lb/cu ft)</b>		
	<b>1,390 (0.042)</b>	<b>3,036 (0.092)</b>	<b>5,611 (0.167)</b>
Maximum (ug/cm <sup>2</sup> /day)	3.7	7.9	14.9
Minimum (ug/cm <sup>2</sup> /day)	0.11	0.22	0.40
Average (ug/cm <sup>2</sup> /day)	1.9	3.8	7.4
Cumulative (ug/cm <sup>2</sup> )	26.6	52.9	103.2
Percent leached	10.2	9.3	9.0

<sup>1</sup> Reported leaching rates beginning at 1 day after treatment. Sampling intervals prior to 1 day not included in this DER.

### III. REFERENCES

AWPA E11-12. 2012. Standard Method of Determining the Leachability of Wood Preservatives.

## Data Evaluation Record 2


### SOIL DEPLETION STUDY (AWPA E20-08)


**Report:** Archer, K. (2017) Viance 11-2016: Soil Depletion Study in Accordance with American Wood Protection Association Standard E20. Project Number: VIAP001, AWP AE20. Unpublished study prepared by VIANCE, LLC. 34p. MRID 50335205

**Guideline:** AWP AE20-08

**Classification:** The Archer (2017) study for Soil Depletion is acceptable and satisfies the AWP AE20-08 data requirement for Viance 11-2016.

**PC Code:** 128101

**From:** James Breithaupt, Agronomist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

**Peer Review:** Diana Hsieh, Biologist   
Risk Assessment and Science Support Branch (RASSB)  
Antimicrobial Division (7510P)

### EXECUTIVE SUMMARY

This study is acceptable and satisfies the AWP AE20-08 data requirement for Viance 11-2016. The soil depletion study includes experiments on disappearance of DCOIT from treated wood used in terrestrial environments after 12 weeks of contact with soil. In the Harrisburg clay soil, the depletion rate was 11.5 % for the 2.5 % treatment rate and was 13.5 % for the 3.1 % treatment rate. In the Mooresville silty clay loam soil, the depletion rates were 29.9 % at the 2.5 % treatment rate and 27.4 % at 3.1 % treatment rate. The difference between the treatment sites suggests that the depletion of DCOIT does occur from 11 to 30% when treated wood is in contact with soil.

### **I. MATERIALS AND METHODS**

**Guideline followed:** The Archer (2017) study was conducted according to the AWP AE20-08 test guideline.

**GLP Compliance:** The soil depletion study was not conducted in compliance with Good Laboratory Practice Standards in EPA 40 CFR Part 160. However, that does not invalidate the study because it was conducted according to the AWP AE20-08 test guideline.

## A. Materials:

**1. Test Material:** DCOIT: 4,5-Dichloro-2-n-Octyl-4-Isothiazolin-3-One (99.93 % purity)

## B. Methods:

Twenty replicate test stakes (14 mm x 14 mm x 250 mm) were cut from each of five southern yellow pine boards. Ten stakes were pressure treated using 2.5 % DCOIT in #2 diesel and ten stakes were pressure treated using 3.1 % DCOIT in #2 diesel (25 % higher treatment rate). The stakes were allowed to equilibrate for five (5) days in a fume hood and then placed in a temperature- and humidity-controlled chamber set at 12 % environmental moisture content (EMC) for seven (7) days. The soils were characterized using the USDA NRCS system.

Samples of the Mooresville, NC silty clay loam soil and Harrisburg, NC clay soil were sieved using a 10-mesh screen (2 mm) to remove large stones and debris. Subsamples of each soil were extracted using nitric acid to analyze for heavy metals (Fe, Mn, Cu, Zn, Pb, and As) using ICP and filtration for acid-insoluble content.

Ten (10) mm of pea gravel were placed into each of 20 containers which were then filled with filtered soil, followed by thorough wetting using deionized water which as allowed to sit for 24 hours to equilibrate. After 24 hours, the excess water was drained. After draining, one pre-weighed treated stake from each of five parent boards was placed in each soil container. The cut ends of each stake were inserted into the soil and after 12 weeks, the stakes were removed and analyzed.

## II. RESULTS AND DISCUSSION

### Soil Depletion

The chemical and physical properties of the tested soils are presented in Table 1 below, and are included in Table 1 and Appendix B of the study. These properties are cited in the Official Series Descriptions (USDA, 1999 and 2010).

Table 1. Soil Properties

Soil	Texture	pH	Cation Exchange Capacity (meq/100 g)	Organic carbon (%)	Acid- Insoluble (%)	mg/kg					
						Mn	Pb	Fe	Zn	Cu	As
Harrisburg (Armenia series) <sup>1</sup>	Clay	5.1	20-30	0.29- 1.16	73	3,357	ND	4,282	ND	120	ND
Mooresville (Chewacla series) <sup>2</sup>	Silty clay loam	6.6	5.6-13	0.29- 1.16	54	496	ND	21,302	53	103	ND

<sup>1</sup> USDA, February, 2010, [https://soilseries.sc.egov.usda.gov/OSD\\_Docs/A/ARMENIA.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/A/ARMENIA.html)

<sup>2</sup> USDA, July, 1999, [https://soilseries.sc.egov.usda.gov/OSD\\_Docs/C/CHEWACLA.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CHEWACLA.html)

The soil depletion study includes experiments on disappearance of DCOIT from treated wood used in terrestrial environments. The measured retention was 0.2 pound per cubic foot (PCF) for the 2.5 % treatment rate and 0.23-0.25 pcf (15-25 % higher) for the 3.1 % treatment rate. Based on the treatment rates, the nominal retention rate is expected to be 24 % higher for the 3.1 % treatment rate, and this nominal retention rate was confirmed (Table 2 of study).

In the Harrisburg soil, the depletion rate was 11.5 % (4 replicates)<sup>1</sup> for the 2.5 % treatment rate and increased to 13.5 % (5 replicates) for the 3.1 % treatment rate, which is a 17 % increase. In the Mooresville soil, the depletion rates were 29.9 % at 2.5 % (4 replicates)<sup>1</sup> and 27.4 % at 3.1 % (5 replicates), which is an 8 % difference (Table 2 of study).

The registrant attempted to explain the approximately 3-fold increase depletion in the Mooresville silty clay loam based on iron content and moisture content at the 2.5 % treatment rate. The iron content in the Mooresville soil is approximately five (5) times higher than in the Harrisburg soil, and the registrant states that the presence of iron increases the microbial degradation of organic compounds. The registrant also claims that that the Mooresville silty clay loam soil had more excess water, and took longer for drainage of the excess water than the Harrisburg clay soil. Regardless of the cause, the study demonstrated that depletion of DCOIT does occur at up to 11-30 % when treated stakes are in contact with soil.

### **III. STUDY DEFICIENCIES AND REVIEWER'S COMMENTS**

None.

### **IV. REFERENCES**

AWPA E20-08 English PDF Standard Method of Determining the Leachability of Wood Preservatives in Soil Contact. Standard published 01/01/2008 by American Wood Protection Association (formerly the American Wood-Preservers' Association).

USDA. July, 1999. Official Series Description: Chewacla Series.  
[https://soilseries.sc.egov.usda.gov/OSD\\_Docs/C/CHEWACLA.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CHEWACLA.html)

USDA. February, 2010. Official Series Description: Armenia Series.  
[https://soilseries.sc.egov.usda.gov/OSD\\_Docs/A/ARMENIA.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/A/ARMENIA.html)

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<sup>1</sup> One outlier was not included in the statistical analysis